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ABSTRACT

Detroit's Peer Teachers as Mirrors and Monitors Project is intended to validate cost effective methods for increasing Academic Learning Time (ALT) for students in grades one through four. A major problem in this research effort has been the design of valid and reliable measures of the components of ALT. One very important component of ALT is student and teacher use of time. This presentation addresses some of the issues involved in measuring student time-on-task, and teacher's use of time with students. Observation methods which produce valid and reliable data without interrupting classes or threatening teachers (too much) are discussed. Samples of observation instruments developed by the project are included, along with issues related to training observers and the establishment of definitions of behaviors to be observed so as to produce high inter-rater reliability. (Author)

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MEASURING ACADEMIC LEARNING TIME:

SOME INSIGHTS THROUGH THE LOOKING GLASS

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ABSTRACT

Detroit's Peer Teachers as Mirrors and Monitors Project is a National Institute of Education sponsored research project intended to validate cost effective methods for increasing Academic Learning Time (ALT) for students in Grades one through four.

A major problem in this research effort has been the design of valid and reliable measures of the components of ALT. One very important component of ALT is student and teacher use of time.

This presentation will address some of the issues involved in measuring student time-on-task, and teacher's use of time with students. Observation methods which produce valid and reliable data without interrupting classes or threatening teachers (too much) will be discussed. Samples of observation instruments developed by the project will be included in the presentation along with issues related to training observers and the establishment of definitions of behaviors to be observed so as to produce high inter-rater reliability.

MEASURING ACADEMIC LEARNING TIME: SOME INSIGHTS THROUGH THE LOOKING GLASS

Introduction

In the early 1980's, educators began to focus attention on the use of time in classrooms as a variable which might explain students' lack of achievement. This focus was the result of considerable research concerning the relationship between engagement rates and achievement (e.g., Fredrick, Walberg and Rasher, 1979; Stallings, 1976 and 1980; Good and Beckerman, 1978; Davidson and Holley, 1970; Anderson and Scott, 1978; Fredrick, 1977; Rosenshine, 1976; Fredrick and Walberg, 1980). In 1981, the National Institute of Education issued a request for proposal for research contracts to investigate cost effective methods for increasing student time-on-task for students in grades 1-4 who attended Title I eligible schools. The monies for these research contracts were allocated from Follow Through funds which were set aside to fund research in promising practices for raising student achievement at these grade levels.

The Detroit Public Schools was one of four districts across the United States to be awarded such a contract. The project which resulted from this award was entitled, "Peer Teachers as Mirrors and Monitors" and attempts to increase the mathematics and reading achievement of students in grades one through four by increasing the amount of time students are engaged in learning tasks in which they experience a low error rate and which are directly related to the outcome measures. The strategy for accomplishing this purpose includes a periodic system of feedback in which teachers are given data by their peers which document their students' engaged-in-learning rates as well as their own classroom management procedures (Mirrors and Monitors) plus four different

types of teacher training, including: Knowledge of Theories and Practices, Modeling/Demonstration/Sharing, Practice in Simulated Conditions, and Coaching/Recycling.

The Mirrors and Monitors data required the design and development of instruments which would provide valid and reliable data on student on-task/off-task behaviors and on teacher behaviors which could be linked to student behaviors in the classroom. Since teachers would be collecting data in peers' classrooms, the instrumentation and collection procedures had to be simple enough so that all teachers involved in the project would feel comfortable using them and unobtrusive so as not to interrupt the normal classroom routine. The data collected were to be shared between the observer and the observed peer teacher which meant that the interpretation of the data had to be simple and straightforward.

Once the instruments were developed, training procedures for teachers and other data collectors had to be designed and tested.

This paper will describe the instruments which were developed for collecting student on-task/off-task data and teacher/classroom level data, the validation procedures used to test these instruments, the training procedures used with data collectors, and some of the first year results gathered with the instruments described.

Student Level Data

Data on students' on-task/off-task status is collected for every student in the classroom every two minutes during the class period. This provides a sample of behaviors for each student throughout the period in the manner of a "snapshot" of the classroom taken every two minutes. When the sample of behaviors is averaged for each student, it gives an approximation of the

proportion of the class period during which the student was either on-task or off-task. Individual observations for each student may also be compared to data collected on the teacher's behaviors in order to diagnose reasons why students may be off-task or on-task during particular parts of the class period.

In order to collect data on every student during every two minute interval, a seating chart format is used (see Figure 1). Prior to the observation, a seating chart which gives the name and location of each student in the classroom is prepared. Each student's name appears in a rectangle which is large enough to accomodate five rows of five marks within the block. The marks represent the students' status as follows: a plus sign (+) for on-task, a minus sign (-) for off-task, and a zero (0) for don't know. For students in the lower grades where regrouping is a frequent occurance, a list of students' names is substituted for the seating chart. In this case, the codes are recorded adjacent to each student's name.

On-task behavior is defined as, "students participating in the intended lesson which is related to either reading or mathematics." Examples of on-task behaviors include: participating in guided lessons, responding orally, engaged in a written assignment, engaged in a discussion that is related to the lesson, and taking a test or quiz. Off-task behavior is defined as, "behavior not related to the lesson or a lack of involvement on the part of students." Examples of off-task behaviors include: engaged in a social interaction, uninvolved in the lesson, exhibiting disruptive behavior, waiting for help, being disciplined, sharpening pencils, daydreaming, and roving about the room. Observers are instructed to attempt to code students either on- or off-task if at all possible. The zero (0) code is used only

FIGURE 1

DETROIT PUBLIC SCHOOLS

PEER TEACHERS AS MIRRORS AND MONITORS

Student Time-On-Task Observation Form

Teacher _____ Time ____:____ to ____:____

School _____ Grade:____ Subject _____

Room ____ Date _____

Observer _____

SEATING CHART

when the observer is unable to observe the student for some reason.

Coding student behavior involves rapid decisions on the part of the observer. A sweep of the classroom is made at the beginning of each two minute observation period. Each sweep follows the same path in order to assure that students are observed in approximately the same segment of the time interval. As the observer glances at each student, he/she observes and makes a decision about the student's on-task/off-task status and records the appropriate mark on the observation form. No attempt is made to make cumulative judgements concerning the students' behavior during the entire two minute interval. Since each of the 25 observations represents only four percent of the total observation, errors resulting from this procedure are minimal.

Classroom Level Data

Teacher/classroom level data are collected simultaneously with student level data in order to provide feedback to teachers on their behavior and on the classroom configuration and activities during the observation period. One of the important goals of the Detroit project is to increase teachers' use of instructionally appropriate behaviors while decreasing those teacher behaviors which cause students to move off-task or which, based upon current research, probably fail to increase student learning. The data collection instruments which were developed record specific teacher behaviors and document activities in which members of the class were involved during each of the two minute observation periods (see Figure 2).

The activities listed on the classroom/teacher observation form are divided into four categories: non-interactive instruction, interactive instruction, off-task, and organization. Non-interactive instruction includes

FIGURE 2

PEER TEACHERS AS MIRRORS AND MONITORS
Observation Form

DIRECTIONS: During each 2 minute observation, record the number of students involved in each of the activities listed below. Circle the number of students involved in activity in which the teacher is directly participating.

School:_____ Teacher:_____ Grade:_____ Room:_____ Subject:_____ Observer:_____ Date:_____

Start time:_____:_____ End time:_____:_____ Number of students:_____

	Observation #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Number of Circles
	Activity																										
Non-Interactive Ins.	Silent Reading																										
	Seat Work																										
Interactive Instruction	Oral Reading																										
	Instructional Explanation																										
	Giving Directions																										
	Discuss/review assignments																										
	Practice/ Drill																										
Off Task	Students Off Task																										
Organization	Management																										
	Distribute/Collect materials																										
	Transitions																										

SUMMARY INFORMATION	total number teacher circles in each area	percent of observations in each area*	target percents for each area
Non-Interactive Instruction	_____	_____	35% or less
Interactive Instruction	_____	_____	50% or more
Off-Task	_____	_____	5% or less
Organization	_____	_____	15% or less

*Divide the total number of teacher circles by the number of observations and multiply your answer by 100

silent reading and seat work. Interactive instruction includes oral reading, instructional explanation, giving directions, discuss/review assignments, and practice/drill. Off-task behaviors include the number of students off-task as defined in the student form. Organization includes management, distribute/collect materials, and transitions. Specific definitions were developed for each of these behaviors (see Figure 3) based upon input from the project teachers.

As a guide to project teachers in the interpretation of the results obtained from using this observation instrument, target percents for each of the four areas addressed on the form are included. These target percents are based upon the work of Stallings (1980). She found that the most effective teachers used interactive instruction at least 50 percent of the time, used non-interactive instruction, at most, 35 percent of the time, used 15 percent or less of the time for organizational activities, and used 5 percent or less of the instructional time in off-task behaviors.

Each observation period consists of a two minute interval during which each student is observed and his/her on-task status is recorded on the student observation form after which the number of students involved in each of the activities listed on the teacher/classroom observation form is recorded in the appropriate location. Finally, the activity in which the teacher is directly involved is indicated by circling the number of students involved in that activity. The student and teacher/classroom observation forms are completed during each two minute interval. During a 50 minute class period, 25 observations are recorded for each student and 25 sets of numbers are recorded on the teacher/classroom observation form.

FIGURE 3

PEER TEACHERS AS MIRRORS AND MONITORS
Classroom Observation Form Activities

ACTIVITY	DESCRIPTION
Silent Reading	Students are reading silently to themselves as a group activity or are working on individual assignments. No writing.
Seat Work	One or more students is/are writing papers, doing computation, or involved in any other silent written work related to the lesson.
Oral Reading	One or more students is/are reading a section from a play aloud or reading a book for the class ro reading group to hear. Oral reading is usually not done in unison; generally, students take turns reading sequential sections from a book. The teacher or the student(s) can also read aloud while the rest of the class follow along in their own texts.
Instructional Explanation	An adult is informing some grouping of students about a subject. Academic discussion or slow-paced question/answer session takes place regarding lecture material, assignments, or problems.
Giving Directions	An adult is explaining an activity, the procedures to be followed, the amount of work to be finished, or rewards for completing the assignment. The discussion is not focusing on the academic content, but on the information that students need to carry out the assignment (or discussing grades).
Discuss/Review Assignment	One or more students is/are receiving information or feedback on work they have completed, or are being evaluated on their work preparatory to continuing the assignment.
Practice/Drill	One or more students is/are verbally involved in reinforcing, repetitive, or rote work. This activity must be differentiated from seat work. Students writing verbal material, as in dictation, are also coded Practice/Drill.
Students Off-Task	One or more students or teacher and students are interacting about work or subjects other than class-related material, or students are not involved in any activity, are arriving or leaving, or moving about the room. (See list of off-task behaviors)
Management	Taking attendance, making/receiving announcements, regrouping, forming lines, discipline, collecting money, etc.
Distribute/Collect Materials	Teacher and/or students are involved in passing out papers, putting away materials, preparing to leave, or preparing or checking materials.
Transitions	Changing from one activity to another.

Observers summarize the observation data recorded on the teacher/classroom level observation form by counting the number of observation periods the teacher was involved in each of the activity areas. This number is converted to a percent by dividing it by the number of observation periods in which data were recorded and multiplying the result by 100. The resulting percent is compared to the target percent for each of the four areas in order to give the observed teacher an idea of how she/he compares to the research based percents and in which areas she/he may need to change behavior patterns. Additional information about the effect of various types of behavior on the part of the teacher can be determined by comparing the two observation forms. For each observation period the behaviors observed and the on-task/off-task status of each student can be compared in order to give the teacher additional information about what specific activities students in the classroom were involved in and what types of activities may have caused them to stray off-task. Grouping patterns are also apparent from the data on the forms including the numbers of students with whom the teacher was working during any given observation period. All of these data provide information and guidance for changing behavior and/or reinforcement for behaviors which result in high on-task levels for students.

Validation Procedures

All observation forms developed by this project were field tested and validated over a one-year period prior to project classroom use. The validation procedure involved criticism and revision of the forms by project staff, project teachers and administrators, and outside consultants knowledgable in this type of data collection. Field tests of each of the instruments were conducted in Detroit schools not involved in the project at

all elementary grade levels and also with high school students. The results of the field tests indicated that the forms produced data which appeared to represent the actual classroom situations observed. Field tests were conducted by pairs of observers and produced high inter-observer reliabilities. (No statistical inter-observer reliabilities were computed since only two observers were involved in the initial field tests and insufficient numbers of observations were available to produce meaningful statistical information.)

Observer Training

Observer training requires two phases. First, observers must learn the definitions of the behaviors to be observed and become familiar with the location of each of the behaviors on the classroom observation form and with the definitions of on-task and off-task behaviors for students. Second, they must be provided with guided practice and independent practice in using the observation forms to code behaviors of students and teachers in a closely supervised situation.

The first phase of the training is best accomplished through presentation of the concepts involved in on-task/off-task behavior data collection and a detailed walk-through of the definitions of each of the behaviors with ample examples presented to the group of persons to be trained. Observers should then be informed that they must memorize these definitions and be able to discriminate among all the behaviors listed on the form.

The guided practice phase of the training should begin with the use of video tapes of actual classroom situations which may be stopped and restarted at any desired point. These situations are used to present the group with classroom situations which they might encounter during the observation period.

Group consensus is reached about how each of the observed situations should be coded on the teacher/classroom observation form. Following the use of video tapes, the group of observer trainees should be divided into two approximately equal groups. One group will role play a classroom situation in which one of them is teaching a lesson and the remaining individuals act as students. While the role play takes place, the other half of the observer trainees codes the teacher and students. After about 20 minutes, the observers are debriefed and their coding forms are compared and discussed by the entire group. Then the two groups switch roles and the process is repeated.

After initial training, the observers should be sent to observe actual classrooms. These observations should be conducted in pairs so that the inter-observer reliability for the observers can be checked. Following each observation, the pair of observers should share their results and discuss with the trainers any discrepancies they observe. At least three practice codings should be conducted before actual data collection is attempted by newly trained observers.

Most individuals can learn to use the forms and collect valid and reliable data in two days. The project has trained over twenty observers and experienced a high degree of success. The initial apprehension expressed by most observers prior to training is that the two minute observation interval might be too short to collect the required data on all students and to record a snapshot observation of the classroom configuration. Following training and practice, nearly all found that they had more than enough time to collect and record the required data.

Sample Data

To illustrate results obtained from using these forms, data on students and teachers at three schools with students from grades 1-4 are presented. These data were collected during the fall of 1982.

TABLE 1

Means and Standard Deviations of Student
On-Task Rates at Three Schools
Fall, 1982 Data

Participants	Grades	N	On-Task Percent	
			Mean	S.D.
School A				
Teacher One	1	26	82%	7%
Teacher Two	1 & 2	24	61	7
Teacher Three	3	18	85	12
Teacher Four	2	25	84	3
Teacher Five	3 & 4	16	68	11
Teacher Six	3	26	91	6
Teacher Seven	2	14	76	11
Teacher Eight	1	24	88	4
Teacher Eleven	4	46	95	6
Teacher Twelve	2	13	67	3
School B				
Teacher Fourteen	2	24	81	18
Teacher Fifteen	1	27	62	11
Teacher Sixteen	1	24	72	4
School C				
Teacher Seventeen	3	33	79	9
Teacher Eighteen	1	27	61	5
Teacher Nineteen	1	29	56	12
Teacher Twenty	4	29	85	4
Teacher Twenty-One	2	32	81	4
Teacher Twenty-Two	2	31	95	4
Teacher Twenty-Three	2	33	56	8

Table 1 above presents means and standard deviations of students on-task rates for twenty teachers at three schools. The on-task percent for students in these twenty classrooms varied from a low of 56% to a high of 95%.

Table 2 presents the mean percent of teacher/classroom level behaviors in each of the four categories measured by the teacher/classroom level form during the same observations presented for students in Table 1.

TABLE 2

Mean Percent of Teacher/Classroom Level Behaviors
For Teachers at Three Schools
Fall, 1982 Data

Participants	Interactive	Non-Interactive	Off-Task	Organization
School A				
Teacher One	7%	88%	0%	5%
Teacher Two	9	68	4	19
Teacher Three	9	81	0	9
Teacher Four	27	66	0	7
Teacher Five	25	49	1	25
Teacher Six	10	83	2	5
Teacher Seven	18	60	3	19
Teacher Eight	6	88	0	6
Teacher Eleven	4	92	0	4
Teacher Twelve	6	70	0	24
School B				
Teacher Thirteen	6	62	11	21
Teacher Fourteen	14	79	1	6
Teacher Fifteen	6	70	2	22
Teacher Sixteen	10	70	0	20
School C				
Teacher Seventeen	8	68	3	20
Teacher Eighteen	31	40	2	27
Teacher Nineteen	25	50	9	16
Teacher Twenty	28	51	0	21
Teacher Twenty-One	12	78	1	2
Teacher Twenty-Two	36	69	14	0
Teacher Twenty-Three	11	68	6	15

Summary

Experience gained from one and one-half years of data collection in the area of time-on-task in conjunction with Detroit's "Peer Teachers as Mirrors and Monitors" has given the author a more realistic perspective on the difficulties and problems associated with this endeavour. This paper has attempted to present a valid and reliable method for collecting data on students and on teacher/classroom level behaviors which can be used to collect these data with a minimum of interruption to the classroom routine and which teachers and other data collectors can use with a minimum of training and difficulty. Data were presented which were collected using these instruments and copies of the instruments were included.

The results of the data collected using these instruments are useful to teachers who have been observed. They give feedback to teachers relative to their behaviors and teaching practices and information on every student in their classroom over an entire class period. The behaviors observed are a subset of all possible behaviors which could be observed in classrooms. It is recommended that teachers who are to be observed have input into which behaviors are to be observed and that opportunities for help be offered to teachers who fail to meet the targets in any given behavioral area. It is also suggested that student data be used by teachers to target instruction and to examine the appropriateness of content and difficulty level of tasks assigned to students who show high rates of off-task behavior.

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